# Variation of floristic richness and composition on gold mine tailings along a climatic gradient in a Savanna ecosystem

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## Abstract

### Background and aims

Studies that investigate variation of plant species composition on mine tailings along climatic gradients are limited yet crucial to inform restoration programs in the face of climate change. The study aimed to determine variation of plant taxa assemblages, species richness on mine tailings along a climatic gradient in Zimbabwean Savanna ecosystems and to assess the interactive effect of rainfall and substrate age together with substrate properties on plant attributes.

### Methods

Compositional data were collected form 53 tailings dumps of (< 50 and > 50 years) from 14 mine sites that were grouped into 4 climatic groups using total annual rainfall as a climate proxy: <450 mm, 450–600 mm, 600–800 mm and 800 − 100 mm. Data were subjected to ordination and two-way analysis of variance.

### Results

Overall plant, forb and grass species richness were significantly ($p < 0.05$) higher within higher rainfall regions. Herbaceous species accumulation was higher for wetter than drier regions while woody species had no distinct trend. Annuals were more frequent in drier regions while perennials did not vary. Analysis of similarity (ANOSIM) showed a general distinction of sites from wettest versus driest regions with overlaps in intermediate sites, this being more for woody than herbaceous species. Species richness significantly increased with tailings age, but the interactive effect of tailings age and rainfall was insignificant.

### Conclusion

The effect of rainfall gradient on vegetation was taxa, growth form and life cycle specific. Species compositional differences are mainly related to changes in substrate N, P, organic carbon, compaction and salinity

**Keywords**: Analysis of similarity (ANOSIM), Forbs, Gold mine tailings, Grasses, Plant community assemblages, Rainfall gradient, Species richness